

CURRICULUM VITAE

Harold Kroto FRS
Royal Society Research Professor

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Born 7th Oct 1939 Wisbech, Cambridgeshire, England.

Education

1947-58	Bolton School, Bolton, Lancashire.
1958-61	BSc, University of Sheffield, 1st class honours degree (Chemistry)
1961-64	PhD, University of Sheffield <i>Electronic Spectroscopy of Unstable Molecules</i> Supervisor: R N Dixon FRS (now Professor, Bristol)
1964-65	Postdoctoral Fellow, National Research Council (Ottawa) with D A Ramsay FRS
1965-66	Postdoctoral Fellow, National Research Council (Ottawa) with C C Costain
1966-67	Member of Technical Staff, Bell Telephone Laboratories, Murray Hill, N.J. (with Y H Pao, now at Case Western Reserve and D P Santry now at McMaster U)

University Career (University of Sussex 1967-)

1967-68	Tutorial Fellow.
1968-78	Lecturer
1978-85	Reader
1985-91	Professor
1991-	Royal Society Research Professor.

Extra-university administration

SRC	Millimetre Wave Telescope Sub-Committee 1977-81
SERC	Millimetre Wave Telescope Users' Committee 1981-85
SERC	Physical Chemistry Subcommittee 1987-90
SERC	Synchrotron Radiation Facility Committee 1987-90
SERC	Chemistry Committee 1988-91
IAU	Sub-group on Astrophysical Chemistry 1987-
MBI	Advisory Board of the Max Born Institute (Berlin) 1993-

Meeting (director, organiser or co-organiser)

Brioni International Conferences 1988, 1990, 1993, ...
Royal Society Discussion Meeting 1992
Fullerene Symposium 1993 (Santa Barbara)
Cursos de Verano (El Escorial) *Fullerenos* 1994

Editorial Boards

Chemical Society Reviews 1986- (Chairman 1990-)
Zeitschrift für Physik D (Atoms Molecules and Clusters) 1992-
Carbon (1992-)
J. Chem. Soc. Chem. Comm. (1993-)

Research Details

University of Sheffield

1961-64 PhD in Free radical spectroscopy by flash photolysis

National Research Council

1964-65	Free radical spectroscopy by flash photolysis
1965-66	Microwave Spectroscopy

Bell Telephone Laboratories

1966-67 Raman Spectroscopy of Liquids, Quantum Chemistry

University of Sussex

1967-72	Free radical spectroscopy/flash photolysis
1967-73	Liquid phase interactions/Raman Spectroscopy
1970-	Unstable species/Microwave Spectroscopy
1972-90	Unstable species/Photoelectron Spectroscopy
1976-	Interstellar Molecules/Radioastronomy
1983-90	Unstable species/Fourier Transform IR Spectroscopy
1985-	Cluster Studies/Carbon, Metals
1990-	Fullerene Chemistry, Carbon nanostructures

Temporary Appointments (Visiting Professorships etc)

1974 Visiting Associate Professor, UBC Vancouver (3 months)
 1976 Visiting Scientist, NRC Ottawa (3 wks)
 1978 Visiting Scientist, NRC Ottawa (3 wks)
 1981 Visiting Professor, USC (3 months).
 1983 British Council Visitor, Inst Rudjer Boskovic (Zagreb)
 1987 CNRS (1 month) Univ Paris Sud (Orsay)
 1988- Visiting Professor UCLA (Astronomy)

Extramural Activities

Sport

Tennis and Squash for Sheffield University (1959-1964).
University Athletics Union Finalists - Tennis (1962 and 1963)
President of Athletics Council, Sheffield University (1963-64)

Graphic Art, Design, Television Film

Art Editor Arrows Sheffield University Arts Magazine 1962-64
Winner of *Sunday Times* Book Jacket Design Competition 1963
Editor, design and layout of *Chemistry at Sussex*
 featured in *Modern Publicity* 1979 (international annual of Graphic Design)
Publicity and logos for Chemical Society Meetings
Logo, letterheads for Science and Engineering at Sussex

Publicity, logo, letterheads, poster for BA Meeting 1983
New Scientist BA Advertisement
Logo and letterhead for Inorganic Biochemistry Discussion Group
Logo and letterhead 1990 for *Venture Research International*
(Formerly *BP Venture Research*)
New Cover design and layout for *Chemical Society Reviews*

Chairman of Board of *VEGA SCIENCE TRUST*
Executive producer of five 1-hour Television Films of Royal Institution Discourses for Vega/BBCSelect

Miscellaneous

1981-82	Tilden Lecturer (Royal Society of Chemistry)
1990	Elected Fellow of the Royal Society
1991-	Royal Society Research Professorship
1992	International Prize for New Materials (American Physical Society, R F Curl and R E Smalley)
1992	Italgas Prize for Innovation in Chemistry
1992	Université Libre de Bruxelles (DHC)
1992	University of Stockholm (PhDHC)
1992	Longstaff Medal 1993 (Royal Society of Chemistry)
1992	Academia Europaea (Member)
1993	University of Limburg(DHC)
1994	Hewlett Packard Europhysics Prize (with D R Huffman, W Krätschmer and R E Smalley)
1994	Moët Hennessy*Louis Vuitton <i>Science pour l'Art</i> Prize

RESEARCH

Main research areas:

- I Spectroscopy of Unstable Species and Reaction Intermediates
(Infrared, Photoelectron, Microwave and Mass Spectrometry)
- II Cluster Science
(Carbon and Metal Clusters, Microparticles, Nanofibres)
- III Fullerenes
(Chemistry, Physics and Materials Science)
- IV Astrophysics
(Interstellar Molecules and Circumstellar Dust)

Research Highlights:

- a) Synthesis in 1976 of the first phosphalkenes (compounds containing the free carbon phosphorus double bond) in particular $\text{CH}_2=\text{PH}$ (with N P C Simmons and J F Nixon, Sussex), Refs 1,7.
- b) Synthesis in 1976 of the first analogues of HCP, the phosphalkynes which contain the carbon phosphorus triple bond - in particular CH_3CP (with N P C Simmons and J F Nixon, Sussex), Refs 2,7.
- c) The discovery (1976-8) of the cyanopolyynes, HC_nN ($n = 5, 7, 9$), in interstellar space (with D R M Walton A J Alexander and C Kirby (Sussex) and T Oka, L W Avery, N W Broten and J M MacLeod (NRC Ottawa)), Ref 4-6, based on microwave measurements made at Sussex, Refs 3,7.
- d) The discovery of C_{60} : Buckminsterfullerene in 1985 (with J R Heath, S C O'Brien, R F Curl and R E Smalley), Refs 8,13,15.
- e) The detection of endohedral metallofullerene complexes (with J R Heath, S C O'Brien, Q Zhang, Y Liu, R F Curl, F K Tittel and R E Smalley), Ref 9
- f) The prediction that C_{60} should be produced in combustion processes and might indicate how soot is formed (with Q L Zhang, S C O'Brien, J R Heath, Y Liu, R F Curl and R E Smalley) Ref 10
- g) The explanation of why C_{70} is the second stable fullerene (after C_{60}) and the discovery of the *Pentagon Isolation Rule* as a criterion for fullerene stability in general (Refs 11,13,15)
- h) The prediction of the tetrahedral structure of C_{28} and the possible stability of "tetravalent" derivatives such as C_{28}H_4 Refs 11,15.
- i) The prediction that giant fullerenes have quasi-icosahedral shapes and the detailed structure of concentric shell graphite microparticles (with K G McKay), Refs 12,13.
- j) The mass spectrometric identification and solvent extraction (with J P Hare and A Abdul-Sada) of C_{60} from arc processed carbon in 1990 - independently from and simultaneously with the Heidelberg/Tucson group; Refs 14,15.
- k) The chromatographic separation/purification of C_{60} and C_{70} and ^{13}C NMR measurements which provided unequivocal proof that these species had fullerene cage structures (with J P Hare and R Taylor, Sussex), Refs 14,15.

PUBLICATIONS

180 research papers. One book "Molecular Rotation Spectra" (Wiley 1975) - reprinted with a new preface by Dover 1992.

Main Publications

- 1) M J Hopkinson, H W Kroto, J F Nixon and N P C Simmons, 'The detection of unstable molecules by microwave spectroscopy: phospho-alkenes $\text{CF}_2=\text{PH}$, $\text{CH}_2=\text{PCl}$ and $\text{CH}_2=\text{PH}$ ', *J.C.S. Chem. Comm.*, 513-515 (1976).
- 2) M J Hopkinson, H W Kroto, J F Nixon and N P C Simmons, 'The detection of the reactive molecule 1-phosphapropyne, CH_3CP , by microwave spectroscopy', *Chem. Phys. Letts.*, **42**, 460-461 (1976).
- 3) A J Alexander, H W Kroto and D R M Walton, 'The microwave spectrum, substitution structure and dipole moment of cyanobutadiyne, HC_5N ', *J. Mol. Spectrosc.*, **62**, 175-180 (1976).
- 4) L W Avery, N W Broten, J M MacLeod, T Oka and H W Kroto, 'Detection of the heavy interstellar molecule cyanodiacetylene', *Astrophys. J.*, **205**, L173-175 (1976).
- 5) H W Kroto, C Kirby, D R M Walton, L W Avery, N W Broten, J M MacLeod and T Oka, 'The Detection of Cyanoheptatriyne, HC_7CN , in Heiles' Cloud 2', *Astrophysics J.*, **219**, L133-L137 (1978).
- 6) N W Broten, T Oka, L W Avery, J M MacLeod and H W Kroto, 'The Detection of HC_9N in Interstellar Space', *Astrophys. J.*, **223**, L105-107 (1978).
- 7) H W Kroto, 'Semistable Molecules in the Laboratory and in Space', Royal Society of Chemistry Tilden Lecture; *Chem. Soc. Revs.*, **11**, 435-491 (1982).
- 8) H W Kroto, J R Heath, S C O'Brien, R F Curl and R E Smalley, ' C_{60} : Buckminsterfullerene', *Nature*, **318**(No.6042), 162-163,(1985)
- 9) J R Heath, S C O'Brien, Q Zhang, Y Liu, R F Curl, H W Kroto, F K Tittel and R E Smalley 'Lanthanum Complexes of Spheroidal Carbon Shells', *J. Am. Chem. Soc.*, **107**, 7779-7780 (1985).
- 10) Q L Zhang, S C O'Brien, J R Heath, Y Liu, R F Curl, H W Kroto and R E Smalley. 'Reactivity of large carbon clusters Spheroidal Carbon Shells and their possible relevance to the formation and morphology of soot', *J. Phys. Chem.*, **90**, 525-528 (1986)
- 11) H W Kroto, 'The Stability of the Fullerenes C_n ($n = 24, 28, 32, 50, 60$ and 70)', *Nature* **329**, 529-531 (1987)
- 12) H W Kroto and K McKay, 'The Formation of Quasi-icosahedral Spiral Shell Carbon Particles' *Nature*, **331**, 328-331 (1988)
- 13) H W Kroto "Space, Stars, C_{60} and Soot", *Science*, **242**, 1139-1145 (1988)
- 14) R Taylor, J P Hare, A K Abdul-Sada, and H W Kroto, "Isolation, Separation and Characterisation of the Fullerenes C_{60} and C_{70} : The Third Form of Carbon." *J. Chem. Soc. Chem. Commun.*, 1423-1425 (1990)
- 15) H W Kroto " C_{60} : Buckminsterfullerene, the Celestial Sphere that Fell to Earth", *Angewandte Chemie* **31**, 111-129 (1992)

SYMPOSIUM LECTURES and SEMINARS

Plenary/Invited Lectures

- 1974 Symp on High Resolution Spectroscopy (Columbus, Ohio)
1976 Symp on Molecular Structure (Austin, Texas)
1978 Faraday Society Spectroscopy Con (Bristol)
1979 14th Internat Free Radical Conf (Sanda, Japan)
Symposium Interstellar Molecules (Meudon, France)
1980 University College Astronomy Symposium (London)
1981 Conference on Submillimetre Wave Astronomy (London)
Advances in Spectroscopy, Faraday Meeting (London).
1983 British Association BAYS lecture (x2) (Sussex)
Federation of Astronomical Socs, Herstmonceux
RAS Disc Meeting on Interstellar Grains (London)
1984 Symposium on Molecular Structure (Austin, Texas)
Microwave/IR Spectrosc of Transients (Cambridge)
EUCHEM Reactive Species in Inorg Chem (Burghausen)
1985 High Resolution Spectroscopy Conference (York)

1986 NATO Workshop PAHs in Space (Les Houches)
Conference on Molecular Astrophysics (Bruxelles)
Symp on Planetary Science, Obs. de Paris (Meudon)
Brioni Conference on Clusters (Brioni, Yugoslavia)

1987 Roy Soc Discussion on The Solar System (London)
High Resolution Spectroscopy Symp (Dijon, France)
Roy Soc of Chemistry Autumn Meeting (Nottingham)
NASA Workshop on Carbon in Space (Ames CA)

1989 Internat Symp on New Aromatic Compounds (Osaka)
Carbon Conference (Pennsylvania State)
ACS Conference (Clusters) Miami
Japan/UK SERC Symposium IMS (Okazaki, Japan)
Faraday Discussion on Clusters (Warwick)
6th ISNA Meeting (Osaka)
Faraday meeting on Clusters (Warwick)
19th Carbon Conference (Pennsylvania State Univ)

1990 German Chem Soc Meeting, Organ Chem (Bad Nauheim)
Solar System Workshop (Clemson, North Carolina)
IOP meeting (Warwick)
Comet Meeting (Bad Honnef Bonn)

1991 4th Chemical Congress of North America (Fuel Science NY)
6th Symposium on Macrocyclic Chemistry (Sheffield)
20th Biennial Conference on Carbon (Santa Barbara)
74th Canadian Chemistry Conference (McMaster, Hamilton)
IOP Annual Meeting, Low Temperature Physics (Birmingham)
Rank Prize Workshop on Molecular Cages (Lake District)
British Association meeting BAYS lecture (Plymouth)
Mackay Symposium (Birkbeck College)
IAU Congress Astrochemistry (Campos de Jordao, Brazil)
Swedish Physical Society (Stockholm)
Fullerene Workshop (RISU, Roskilde, Denmark)
Condensed Matter Physics 1991 (CMMP 91, Birmingham)

1992 Workshop on Atoms and Clusters 92 (Atami, Japan)
Symp. on Atomic and Molecular Structure (Trentino)
Portuguese Chemistry Society Meeting 1992 (Lisbon)

1st Italian Fullerene Conference (Bologna, Italy)
 IOP meeting on Fullerenes (Rutherford Lab)
 Universite Libre de Bruxelles Conference (Belgium)
 Pittcon 92 Conference (New Orleans, USA)
 American Physical Society meeting (Indianapolis)
 Leermaker Symposium (Wesleyan U, Conn, USA)
 Infrared Astronomy Conference (Calgary, Canada)
 Adriatico Conference on Clusters (Trieste, Italy)
 Invited Lecturer Cursos de Verano 92 (El Escorial)
 European Materials Res Soc Meeting (Strasbourg)
 IOP/RSC Joint Symposium on Fullerenes (London)
 Vacuum Ultra Violet Meeting (VUV10, Paris)
 11th Canadian Theoretical Chem. Conf. (Montreal)
 12th Conf on Chemical Education (UCDavis, USA)
 23rd European Conf, Mol Spectros (EUCMOS23, Vienna)
 Symposium fur Theoretische Chemie (Blixen, Italy)
 Gordon Conference on Clusters (Irsee, Germany)
 Italgas Chemistry Prize Lecture (Turin)
 University of Helsinki (Spec Lect) (Finland)
 Gordon Combustion Conf (Spec Lect) (Hawaii)

- 1993 Italian Fullerene/Superconductivity Meeting - Pisa
 Croatian Chemical Society Symposium - Zagreb
 Fullerene/Superconductivity Meeting - Kirchberg
 ACS Meeting (Fullerenes) - Denver
 Sydney Leach Symposium - Paris
 Theoretical Symposium - Namur
 NATO Fullerene Workshop - Crete
 Centenary Conf of Norwegian Chemical Society - Oslo
 Fullerenes 93 Symposium - Santa Barbara
 IURCAM Conference - Tokyo
 Solid State Devices Conference - Tokyo
 Span/American Inorg Chem Conf - Santiago (Spain)
 Brioni International Conference - Brioni
 Materials Conference - Wroclaw (x2)
 Spanish Materials Conference - Oviedo
 ACOLS Conference - Melbourne (x2)
 London Schools Science Symposium
- 1994 Association of Science Education Conference (Birmingham)
 New Organic Materials Conference (Madrid)
 Science Research Institute Inaugural Meeting (Salford)
 Student Chemical Society Centenary Meeting (Sheffield)
 Berzelius Dagarna (Stockholm)
 European Physical Society - Hewlett Packard Prize Lecture (Madrid)
 Sussex University Science Teachers Conference (Sussex)
 World Affairs Conference (Boulder, Colorado) (x2)
 Cluster Workshop (Ameland, Netherlands) (x4)
 3rd Workshop on Advances in Phys Chem (Nanjing, China)
 Cursos de Verano Fullerene Workshop (El Escorial, Spain)
 LVMH Science pour l'art Prize lecture (Paris, France)
 Gordon Conference (Ceramic Materials) New Hampshire (special lecture)
 Materials Research Soc Meeting (Boston)

Named/Special Lectureships

- 1992 Probst Lecture - Southern Illinois Univ (USA)
- 1993 Cherwell-Simon Lecture (Oxford)
 Steinhofer Lecture (Kaiserslautern)

Dreyfus Lecture (UCLA)
 John Coffin Memorial Lecture (University of London)
 30th Anniv Lecturer (Chinese Univ of Hong Kong)

- 1994 Brode Lecturer (Whitman College, Washington, USA)
 Winegard Lecturer (Guelph University, Ontario, Canada)
 Kolthoff Lecturer (University of Minnesota, USA)
 Rayleigh Lecturer (Harrow School)
 Chemical Inst of Canada Lecturer (Sherbrooke University, Quebec, Canada)
 Distinguished lecturer (University of Kentucky, Center for Applied Energy Research)
- 1995 Werner Lecturer (Trinity College, Dublin)
 Tizard Lecturer (Westminster, School)

Research Seminars (Overseas)

- 1974 Bell Telephone Labs (NJ), NRC (Ottawa), UBC (Vancouver)
 1976 Paris Sud (Orsay), Harvard, NRC (Ottawa)
 1977 Lille, Brussels, Montreal, Waterloo
 1978 Cal. State (L.A.), Cal Tech.(Pasadena), Arizona (Tucson), USC(Los Angeles), Herzberg
 Institute (NRC, Ottawa), UC Berkeley
 1979 UBC (Vancouver), Montreal
 1980 IBM (San Jose), UC Santa Barbara, USC (Los Angeles), Chemical Society Zurich
 1981 UC Berkeley
 1982 Trinity College (Dublin), NRC. (Ottawa)
 1983 Basel, Kiel, Giessen, Inst.Rudger Boskovic (Zagreb)
- 1985 ETH (Zurich), Basel, Inst. R. Boskovic (Zagreb), Rice Univ. (Houston), Texas A&M,
 Texas Tech.
- 1986 Harvard, Guelph-Waterloo, Aachen (Tech Hochschule), Chicago
- 1987 USC (Los Angeles), UCLA (Astron), Berkeley, JPL (Pasadena)
- 1988 UCLA(Chem), Stanford, Arizona(Tucson), Arizona State (Tempe), Tech. Hochschul
 (Darmstadt), Max Planck Inst (Martinsried)
- 1989 MPI (Munich), UCLA(Chem), Oregon, JPL(Pasadena), Berkeley, NASA (Moffett Field),
 Toronto, Montreal, Guelph.
- 1991 California (Los Angeles, UCLA), California (Berkeley), Cal Tech (Pasadena), California
 (Santa Barbara, UCSB), Belo Horizonte (Brazil), Recife (Brazil), Erlangen, Freiburg,
 Heidelberg, Shell (Amsterdam), NIST (Washington) NRC (Ottawa), Arizona(Tucson)
- 1992 Pisa (Italy), Michigan (Ann Arbor, USA), Chicago (USA), McGill (Montreal, Canada),
 Chemical Society of Zurich, Laue Langevin Laboratory (Grenoble), Aarhus (Denmark),
 Helsinki (Finland), Niels Bohr Inst(Copenhagen), Stockholm (DHC lecture), Tokyo
 (Japan), Shinshu (Nagano, Japan), Kitagawa Industries (Tokyo Japan), Nobeyama Radio
 Observatory (Japan), NRC (Ottawa, Canada)
- 1993 Basel Chemical Society, ULB Bruxelles (DHC lecture), Josef Stefan Institute
 (Ljubljana), Limburg (DHC lectures), UC San Diego, Crete, NEC Japan, Shinshu,
 Shizuoka, Materials Institute (Warsaw), Milan, Berlin Chemical Society
- 1994 2xRSC (Belgium section) lectures (Brussels) (1 British School), Swedish Royal
 Academy (Stockholm), Stockholm University (Physics Dept), Herzberg Inst NRC
 Ottawa, Braunschweig, Scherring (Berlin), Humboldt Univ Berlin, Bielefeld, KFA
 (Julich), Peking U x2 (Beijing), Bell Labs NJ, UNAM Mexico City, UCLA (Astronomy)

1995

UK Research Seminars (* > 1)

Sussex (Chemistry, Physics, Astronomy, Biology*), Cambridge* (Chemistry and Astronomy Depts), Southampton, Oxford, Reading, Nottingham, Sheffield*, Warwick, Glasgow, Strathclyde, East Anglia, Coleraine, Manchester, Edinburgh, Birmingham, U.C. London (Chemistry and Astronomy), Bristol, ICI, Surrey.

UK General Lectures for Students and Public (Chemistry/Astronomy)

Southampton*, Reading*, Sussex*, Exeter*, Bristol*, Bath, Surrey, Essex, Imperial College, University College, Cardiff, Kent, Swansea, U.C. North Wales, Portsmouth, Leicester, Loughborough, Thames, Durham, Leeds, Nottingham, Open University, Cambridge, RSC (Sheffield) RSC (Cumberland), Brighton Astron. Soc., Eastbourne Astron. Soc., Croydon Astron. Soc., Alembic Club (Oxford), U.C. Sussex (Astron, Biology) Q.M.C. Sussex Town and Gown, Mid-Kent Astronomy Society, Royal Institution (Friday Evening Discourse), East Midlands RSC.

- 1993 Bath, Cambridge, Imperial College, Birmingham, Warwick Royal Society, Nottingham, Liverpool, Pfizer Company,
1994 Leicester, Aston, Royal Institution (Friday Evening Discourse (#2)), Sussex, East Anglia, Surrey
1995 Durham, Liverpool, Queen's (Belfast), Coleraine

Schools' Lectures

Christ's Hospital School, Worthing Sixth Form College, Kingston Polytechnic (Schools Lecture), RSC Schools L RSC Essex Schools Lecture, Chelsea College, Charterhouse, London Schools (Q.M.C.), King's School Canterbury, St Dominics 6th form College Harrow, Dreyfus Schools' Lectures, 1986 at Royal Institution, St Paul's School for Girls Open Day Lectures (Sussex), Hurstpierpoint College BAYS Lecture (Southampton)

BROADCAST INTERVIEWS etc

- 1976 BBC Radio (Science Now) "Interstellar Chains"
1977 BBC Radio World Service "Interstellar Chains"
1979 BBC TV OU Film based on my lecture "Chemistry between the Stars"
1985 BBC Radio World Service "Chemistry in Space"
1985 BBC Radio Sussex "Chemistry in Space"
1986 BBC (Science Now) "C60, Buckminsterfullerene"
1989 USA Local Radio Carbon in Space)
1991 BBC Radio programme - "Science Now"
1992 BBC Radio World Service (x2)
1992 BBC TV "Molecules with Sunglasses" Horizon
1992 RAI TV Interview for Italian Television (Premio Italgas)
1992 NDR TV Nord Deutsche Rundfunk Programme on Fullerenes
1993 SFB Radio - Sender Freies Berlin, Radio
1993 UCLA video film Dreyfus Lecture
1994 BBC Select TV - Royal Institution Lecture

RESEARCH GRANTS

- | | | | |
|------|------------------------|-------|--------|
| 1970 | Microwave Spectroscopy | (SRC) | 10 000 |
| 1974 | Microwave Spectroscopy | (SRC) | 24 000 |

1974	Microwave Spectroscopy	(Sch)	10,000
1978	Photoelectron Spectroscopy (with M F Lappert)	(SRC)	18,000
1979	Computer	(SRC)	20,000
1977	PDF (with J F Nixon)	(SRC)	18,000
1977	Astronomy (with T Oka)	(NATO)	2,500
1981	Infra Red Spectroscopy	(SERC)	72,000
1980	Quad Mass Spectrometer	(RS)	5,000
1983	IR spectroscopy	(SERC)	20,000
1986	Jet Cooled i.r.spectroscopy	(SERC)	33,000
1987	Clusters (with A J Stace)	(SERC)	157,000
1992	Fullerene Chemistry with R Taylor/ D R M Walton	(BP/ICI/SERC)	200,000
1992	Cluster Rolling Grant with A J Stace/ J N Murrell	(SERC)	300,000

MAIN RESEARCH COLLABORATION

The value of microwave and photoelectron techniques to a wide area of chemistry has been highlighted by fruitful collaboration with colleagues here at Sussex. One important research project carried out with D R M Walton involved the synthesis and study of long chain polyynes. This work led to our detection this species in interstellar space by Radioastronomy carried out with T Oka and astronomers at the Herzberg Institute for Astrophysics, NRCC Ottawa. A project, carried out with J F Nixon has opened up a new field of organophosphorus chemistry. Work has been carried out in collaboration with J P Maier (Basle) to study the ions of unstable molecules is now in progress. Cluster Beam studies on Carbon with R F Curl and R E Smalley (Rice). Astronomy Research has been carried out with M Jura at UCLA. The present Sussex Programme on Fullerene Chemistry is being carried out in collaboration with R Taylor and D R M Walton.

ASSOCIATED RESEARCH PERSONNEL

35 D.Phil students,
10 Chemistry by Thesis students
12 Postdoctoral Fellows.

POPULAR PRESS COVERAGE

Interstellar Molecule Discoveries,

Ottawa Citizen, The Times, The New York Times, New Scientist, Scientific American

Unstable Phosphorus Molecules:

New Scientist

Fullerenes

New York Times (x2), The Daily Telegraph, Houston Chronicle, New Scientist, C&E News, Omni, Sky and Telescope, Science Now, Economist, Der Spiegel, Time, Daily Telegraph.....

TEACHING EXPERIENCE

Lecture Courses (Sheffield University)

(1961-1963) taught O-level Chemistry at Sheffield Technical College

Lecture Courses (University of Sussex 1968-)

Chemistry Highlights Lectures for Freshers
1st and 2nd year Spectroscopy courses
Structural Methods (2nd year course)
Symmetry (2nd year)
Advanced Structure (3rd year course)
Valence Theory for Biochemists (2nd year course).
Rotational Spectroscopy (3rd year option)
Astrophysical Chemistry (3rd year option)
Topics in Chemical Physics (3rd year course)
High resolution Techniques (graduate course)

Lecture Courses (Univ. of Southern California, Los Angeles, 1981)

Chemistry & Spectroscopy of Interstellar Molecules

Seminars and Tutorials (Sussex)

Atomic and Molecular Structure (1st year course).
Mechanistic Principles (1st and 2nd year courses).
Thermodynamics (1 year course).
Conceptual Models (3rd year option course).
Synthesis (1st year course).
Statistical Mechanics

Practical Courses (Sussex)

1st year Introductory Practical Chemistry
2nd year Physical Chemistry (organiser 1978-80)
3rd year Chemistry and Chemical Physics Projects.

ADMINISTRATIVE POSITIONS

University of Sussex

Chairman of the University Safety Committee (1986-7)
School Undergraduate Admissions Organiser (1973-1976).
Chemistry by Thesis Sub-Board (1975-1978), Sec (1976-78).
Chemical Physics Subject Group, Secretary (1974-76), Chairman (1976-82 85-87).
Chemical Physics Sub-Board, Secretary (1974-76) Chairman (1979-83, 85-87)
School Joint Committee (1973-74, 77), Chairman (1974)
White House Careers Weekend (Weekend Residential Seminar Course on Careers for 3rd year students), Organiser (1974)
Editing, design and layout of "Chemistry at Sussex" School, Teaching and Research Handbook (copy available). The cover design was reproduced in "Modern Publicity", a major international annual of the best in graphic art and design
School Chemical Society Lecture Organiser (1987-)
University Senate (1979-1980).
Science Committee (1980, 1981-2, 1985-7)
Laboratory Director (1983-86): Overall responsibility for Tech Staff logistics, deployment, grading etc; School research strategy, budgeting, expenditure, building and laboratory space allocation.